



CLEAR CREEK CENTRAL CITY SUPERFUND SITE

PROPOSED PLAN TO AMEND THE RECORDS OF DECISION FOR OPERABLE UNITS 3 AND 4 TO ADD AN ON-SITE REPOSITORY

CDPHE and EPA propose to amend the Clear Creek/Central City Superfund Site Operable Unit 3 and 4 Records of Decision to provide for the construction of an on-site repository to consolidate mining-related materials associated with remedial actions in Clear Creek and Gilpin counties.

We want to hear from you:

Opportunities for

Public Comment

Public Comment Period:

June 1, 2006 to June 30, 2006

Public Meeting:

June 15, 2006, 6:30 pm Gilpin County Court House

Written comments will be accepted and must be postmarked or sent by email by close of business on June 30, 2006

Comments should be sent to:

Jim Lewis Colorado Department of Public Health and Environment 4300 Cherry Creek Drive South B2 Denver, CO 80246

Or
Email your comments to:
Jim.lewis@state.co.us

INTRODUCTION

The Colorado Department of Public Health and Environment (CDPHE), the lead agency for activities at the Clear Creek/Central City Superfund Site, in cooperation with the U.S. Environmental Protection Agency (EPA), recommends the addition of a remedial action component to the Operable Unit (OU) 3 and OU 4 Records of Decision (ROD).

This proposed amendment provides for the construction of an on-site repository, which would be specifically designed and operated to contain mining-related materials generated during response actions in the Clear Creek/Central City Superfund Study Area (Site). These materials include metals-contaminated waste rock, mill tailings, sediments and solids generated from the treatment of acidic metals-laden surface and ground water from historic underground mine workings. The repository would be constructed on a mining-impacted property. This proposed action also addresses the property's existing environmental problems and results in reclamation of the impacted land.

This Proposed Plan identifies this amendment to the OU 3 and 4 RODs as a preferred alternative for addressing certain mining-related materials. The OU3 and 4 RODs included several options for addressing mine waste rock and tailings:

- in-place capping
- consolidation and capping
- off-site disposal to a Front Range landfill
- consolidation into an on-site repository

However, neither the OU3 ROD nor the OU4 ROD explicitly included construction of a repository. This plan:

- summarizes the rationale for the proposed amendment
- lists the three potential repository locations
- identifies a preferred potential location

As the CDPHE and EPA gained experience and knowledge cleaning up Colorado mining-impacted sites, it became apparent that the construction of an on-site repository for the consolidation of Site response action materials would provide a more protective, efficient, and effective opportunity to clean up mine wastes and dispose of water treatment plant solids.

Waste rock piles or tailings already identified for removal would be removed and transported to the on-site repository for consolidation. Solids generated from the treatment of acid mine drainage in Clear Creek and Gilpin counties will be dried at the repository and consolidated rather than being taken to a Front Range landfill. Reduced costs related to disposal of the treatment plant solids would offset anticipated operational costs of the repository. The repository would reduce the need for in-place capping of individual waste rock piles and mill tailings in Clear Creek and Gilpin counties.

Local voluntary projects such as recent EPAapproved mine waste consolidation activities by the Clear Creek Watershed Foundation are examples of projects that would benefit from the availability of a repository.

The public is invited to review and comment on this Proposed Plan. After reviewing and considering all information submitted during the public comment period, the CDPHE and EPA will announce a final decision. If the decision is to add the on-site repository component to the Superfund cleanup, a ROD amendment will be issued.

SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

The Site is located in Clear Creek and Gilpin counties, approximately 30 miles west of Denver. The Superfund study area covers the 400-square mile drainage basin of Clear Creek. The water quality of the watershed is compromised by several sources of metals contamination, such as acid mine drainage from historic mine tunnels, ground-water contamination associated with flooded historic underground mine workings and sediment eroded from mine waste rock piles and tailings located near Clear Creek and its tributaries.

The Site was added to the National Priority List (NPL) in 1983. The OU 3 ROD, signed in 1991, selected response actions for acid mine drainage and mine waste rock piles. The OU 3 ROD also included treatment of the Argo Tunnel discharge with chemical precipitation and treatment of Virginia Canyon ground water in Clear Creek County; and for Gilpin County, the collection and piping of the Gregory Incline, National Tunnel, and the Quartz Hill Tunnel discharges to prevent potential human contact with contaminated tunnel waters. A decision as to whether or not to treat these discharges was deferred to the OU4 ROD pending further investigation of the sources of metals contamination in the North Fork sub-basin of Clear Creek.

The OU 3 remedy called for in-place capping of waste rock piles, tailings piles, and/or slope stabilization of the following locations:

- Gregory Gulch Numbers 1 and 2 waste rock piles
- Chase Gulch Numbers 1 and 2 waste rock piles
- Clay County, Boodle Mill, McClelland Mill, North Clear Creek, Golden Gilpin Mill, Black Eagle Mill and Little Bear tailings piles
- Quartz Hill tailings pile

The OU 3 ROD also considered on-site consolidation of certain waste rock and tailings piles; however, individual pile capping was selected because it was predicted to be more cost-effective.

The OU 4 ROD, signed in 2004, provided for:

- the collection, conveyance and active treatment of the Gregory Incline discharge and ground water in Gregory Gulch, a tributary to the North Fork of Clear Creek;
- the collection, conveyance and passive treatment of the National Tunnel discharge; and
- sediment control through the implementation of capping, stabilization, and run-on controls, and/or removal at the Argo, Pittsburg, Mattie May, Baltimore, Iroquois, Anchor, Hazeltine, Druid, Upper Nevada Gulch, Niagara, Centennial, Old Jordan and Gregory Gulch Number 3 waste rock piles.

The OU 4 ROD contemplated several options for the remediation of the waste rock and tailings piles:

- in-place capping
- consolidation and capping
- off-site disposal to a Front Range landfill
- consolidation into an on-site repository

SCOPE AND ROLE OF THE RESPONSE ACTION

Operable Units 3 and 4 are two of the four OUs identified for the Clear Creek/Central City Site. The OU1 ROD was amended/superceded by the OU 3 ROD. The OU 2 ROD included slope stabilization, capping, run-on and run-off controls for five mine waste and tailings piles. Response actions are complete at all but the Quartz Hill mine waste pile.

This Proposed Plan does not change the original selected OU 3 or OU4 remedies for ground water or collection of mine tunnel discharges. The preferred remedy discussed in this Proposed

Plan is limited to constructing a mine waste repository. This plan supports the decisions made in the existing decision documents by providing an additional way to address Site mining-related materials.

SUMMARY OF SITE RISKS

CDPHE and EPA assessed potential impacts to human health and the environment from mine waste piles and tunnel discharges. The risk assessment determined that ecological risks were greater than human health risks at the study area.

Human Health Risks: The primary contaminants of concern (COC) for humans at this Site are arsenic and lead. Health risks to humans could result from drinking ground water with high concentrations of these metals, incidental ingestion of tailings and waste rock, and inhalation of airborne dust. Human health risks are unlikely from drinking surface water, swimming in surface water or eating fish.

Arsenic contributes most significantly to potential human health risk from ground water and tailings. All the metals evaluated for the inhalation pathway pose potential risks to human health

The OU4 clean-up action objective is to reduce the potential for future human exposure by capping, stabilizing or removing mine waste piles. Control measures will be used during clean-up activities that create dust to limit potential exposure.

Ecological Risks: Contaminants of concern for aquatic life include zinc, copper, cadmium, and manganese. These metals are found in surface water and primarily affect trout and aquatic insects in the North Fork and main stem of Clear Creek. The fish species that were evaluated include rainbow, brook, and brown trout.

Within the North Fork of Clear Creek, metals concentrations are significantly elevated and there is a clear risk of adverse reproductive effects to trout and, at certain times of the year, threats to the survival of trout. Metals concentrations in the tributaries of the North Fork including Gregory Gulch, Russell Gulch, and Chase Gulch also pose risks to trout. Macroinvertebrates are severely affected in the main stem of the North Fork and Gregory Gulch. Tunnel discharges within the North Fork (Gregory Incline, National Tunnel, Quartz Hill Tunnel) are acutely toxic to trout and macroinvertebrates. While the metals concentrations in Clear Creek are lower than in the North Fork of Clear Creek, the concentrations in Clear Creek impair reproduction and reduce fish populations. Monitoring and assessment by the Colorado Division of Wildlife confirmed the findings of the ecological risk assessment and no fish have been observed in North Clear Creek downstream of Black Hawk.

The OU4 actions are intended to reduce runoff from tailings and waste rock piles to minimize contamination of ground water and streams. The remediation goal is to promote the survival of brown trout in North Clear Creek and allow for a viable reproducing brown trout population in Clear Creek.

SUMMARY OF ALTERNATIVES

The original OU 3 and 4 RODs contemplated several options for the disposal of the waste rock and tailings piles: in-place capping, consolidation and capping, off-site disposal to a Front Range landfill and/or consolidation into an on-site repository. However, neither the OU3 ROD nor the OU4 ROD explicitly included *construction* of a repository. Solids generated from the treatment of the Argo Tunnel surface water and ground water from historic underground mine workings are currently being disposed of in a Front Range landfill.

This proposed amendment adds an additional remedial component, the on-site repository, to the previously selected remedial alternatives.

This amendment would allow materials that are subject to Superfund response actions to be consolidated within an on-site repository that would be constructed within the Clear Creek/Central City Superfund Site Study Area. More specifically, these materials include tailings and waste rock piles, sediment from sediment control structures and solids from the treatment of acid mine drainage in Clear Creek and Gilpin counties.

The proposed amendment does not eliminate individual capping of some waste rock or tailings piles. The addition of a repository provides more flexibility and efficiency in addressing mine waste.

Repository Background

EPA and CDPHE began initial discussions of the construction of an on-site repository in 1997. In 2000, CDPHE contracted an engineering consulting firm to assess three mining-impacted properties and determine which property would be the best location for the construction of an on-site repository. Only mining-impacted properties were considered in order to promote beneficial reuse. Two of the properties evaluated are located in Gilpin County, the Glory Hole and the Druid Mine area, and the third property is the Gem/Franklin area in Clear Creek County (see Figure 1).

The preferred location for a potential repository is the Druid Mine area, specifically the Church Placer Claim portion, due to the suitability of the terrain, acreage, capacity (270,000 cy) and access. Also, sampling results show that the Church Placer Claim is contaminated with metals including arsenic, cadmium, copper and lead from historical mining and the 1990s-era operation of a cyanide-based heap leach facility. Construction of the repository will control the contamination on the property.

The property's surface is disturbed and lacking vegetation. During rain storms and snow melt, metals-contaminated surface water and sediment run off the property into South Willis Gulch, a tributary to the North Fork of Clear Creek. The human health and ecological risks associated with this property are the same as those described in "Summary of Site Risks." The OU4 ROD requires remedial action for the Druid Mine/Church Placer Claim. While the Gem Mine and the Glory Hole both have significant mining impacts, the potential run-off problems and off-site sediment runoff potential of these sites do not appear to be as significant as the Church Placer. Locating the repository at the Druid Mine/Church Placer Claim would promote remedial action efficiencies. The actions needed to stabilize the site and prevent continued off-site transport of contaminated materials are complementary with the construction of an engineered repository.

Currently, the Druid Mine area and Church Placer Claim is a barren, highly eroded slope in the South Willis Gulch drainage. As the repository is filled, a soil cover will be constructed and vegetated. These restoration activities will enhance the local ecology and present a more attractive site. The site will ultimately have potential productive uses, such as habitat for wildlife or Gilpin County open space.

If the ROD Amendment is approved but circumstances prevent construction of the repository at the Druid Mine area and Church Placer Claim, the Glory Hole and Gem/Franklin sites will be considered.

EVALUATION OF ALTERNATIVES

Table 1 provides a comparison of the Remedial Action alternatives based on seven of the nine National Contingency Plan criteria. The first two clean-up evaluation criteria, overall protection of human health and the environment, and compliance with Applicable or Relevant and Appropriate Requirements

(ARARs), are threshold criteria that must be met by the selected remedial action. The remaining criteria are balanced to help select the preferred remedy. The community acceptance criteria evaluation will not be completed until comments on this Proposed Plan are evaluated.

1. Overall Protection of Human Health and the Environment

The proposed amended remedy will continue to provide protection of human health and the environment through containment in an on-site repository. The repository will eliminate exposure pathways and significantly reduce mobility through containment.

Combining the OU4 remedial action at the former Druid Mine property with the on-site repository will remediate the adverse impacts remaining at that property, promote the beneficial reuse of a "Brownfield," and eliminate the need for transportation of the materials to a Front Range landfill.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The proposed amended remedy will comply with Federal and State ARARs. A complete list of all ARARs identified for OU4 remedial actions can be found in the 2004 OU 4 Record of Decision, available at the EPA or CDPHE (see back page).

3. Long-Term Effectiveness and Permanence

The proposed amended remedy will prevent exposure and spread of contaminants through containment. Long-term monitoring and maintenance will ensure effectiveness.

Institutional controls will provide long-term effectiveness consistent with future site conditions and land use. Containment in the repository represents a similar level of effectiveness as containment in a landfill and a higher level of effectiveness as compared to containment in place (capped tailings piles). The proposed amended remedy provides an overall gain in long-term effectiveness, since a higher volume of mine waste material is contained in

an engineered repository. It also may facilitate additional voluntary local cleanup, which would further increase the overall remedial effectiveness.

4. Reduction of Toxicity, Mobility or Volume (TMV) through Treatment

The proposed alternate remedy and the original ROD rely on containment for reduction of mobility, but toxicity is not reduced. The large volume of mining-related materials makes treatment or off-site disposal not practical for much of the material. Drying the water treatment solids significantly reduces its volume.

NCP Evaluation Criteria

- 1. Overall protection to human health and the environment: addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated or reduced;
- Compliance with applicable or relevant and appropriate requirements (ARARs): addresses whether or not a remedy will meet all federal and state environmental laws or regulations;
- 3. <u>Long-term effectiveness</u>: refers to the ability of a remedy to provide reliable protection of human health and the environment;
- 4. Reduction in toxicity, mobility, or volume of contaminants: refers to the preference for a remedy that reduces health hazards, the movement of contaminants, or the quantity of contaminants at the site;
- 5. <u>Short-term effectiveness</u>: addresses the period of time needed to complete the remedy:
- 6. <u>Implementability</u>: refers to the technical and administrative feasibility of a remedy;
- 7. <u>Cost</u>: evaluates the estimated capital, operation, and maintenance costs;
- 8. <u>Supporting agency acceptance</u>: indicates whether the supporting agency agrees with, opposes, or has no comment; and,
- 9. <u>Community acceptance</u>: includes determining which components of the alternative interested persons in the community support, have reservations about, or oppose.

The amended remedy represents the maximum extent to which permanent solutions and treatment technologies can be incorporated into Superfund response actions to address mine waste piles and water treatment solids at the Site. The materials will not be disposed of offsite, thus addressing the National Contingency Plan statutory preference for on-site disposal.

5. Short-Term Effectiveness

The addition of the proposed alternative to the OU3 and 4 remedies will not significantly increase short-term risks. The original ROD involved similar activities including loading and transport of mine waste materials. Attention to dust control will be required during loading, transport of mine waste and materials handling and drying of treatment solids at the repository.

6. Implementability

The proposed amended remedy and the original ROD remedy are technically and administratively feasible and rely on proven technologies.

7. Cost

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine costeffectiveness. Proportional to costs, the proposed additional remedy will provide additional flexibility for future mine waste disposal. This allows more cleanup than would be done without the repository for a similar net present value as compared to proceeding with the OU4 remedy and off-site disposal of Argo Treatment Plant solids. The construction of a 270,000 cubic yard on-site repository is estimated to cost \$1,470,000. Part of the capital costs would be offset by clean-up efficiencies since the proposed repository site otherwise needs remediation. Costs saved by using the repository to manage treatment solids are estimated to be \$165,000 per year. Disposal of

sediment and mine waste piles in the repository over off-site disposal are estimated to be another \$25,000 to \$65,000 per year, for a total operational benefit of \$190,000 to \$230,000 per year. Annual operations and maintenance costs to manage the repository are estimated to be \$175,000. Therefore, the repository is anticipated to provide an annual benefit of \$15,000 to \$55,000 per year.

8. Community Acceptance

Community acceptance will be evaluated after the public comment period ends.

SUMMARY OF THE PREFERRED ALTERNATIVE

The CDPHE and EPA propose to add an additional remedial alternative component, an on-site repository, to the previously selected remedial alternatives. This action is the Preferred Alternative because it provides substantial risk reduction through containment of mining-related materials generated during Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions within an on-site repository. The proposed additional remedial alternative meets the threshold clean-up evaluation criteria (overall protection of human health and the environment and compliance with ARARs). The proposed alternative will achieve remedial action objectives for the contaminated material and reduce mobility of contaminants. It makes use of proven technology that will be protective over the long term.

Additionally, environmental problems at the Druid Mine/Church Placer Claim area will be addressed with the construction of the repository and prevent further off-site releases from this property. The addition of a repository provides more flexibility and efficiency in addressing mine waste and fosters increased protection of the environment.

Location of Information Repositories:

The Proposed Plan and other documents in the Administrative Record are available at the following locations:

Gilpin County Court House

203 Eureka Street Central City, Colorado 80427

Upper Clear Creek Watershed Association

2060 Miner Street Idaho Springs, Colorado 80452

Colorado Department of Public Health and Environment

Hazardous Materials and Waste Management Division Records Center 4300 Cherry Creek Drive South, B-215 Denver, CO 80246 303-692-3331 M-F, 8:00 AM-12:00 PM and 1:00 PM-5:00 PM An appointment is recommended

EPA Superfund Records Center

999 18th Street, Suite 300 Denver, CO 80202 303-312-6473 M-F, 8:00 AM-4:30 PM

TABLE 1. COMPARISON OF REMEDIAL ALTERNATIVES BASED ON THE NATIONAL CONTINGENCY PLAN EVALUATION CRITERIA		
CRITERIA	Operable Unit 3 and Operable Unit 4 Selected Alternatives (Combination of on-site individual waste pile capping, on-site consolidation and removal to a Front Range landfill)	Amended Preferred Alternative (Adds On-site Repository. Retains option of individual waste pile capping and consolidation)
Overall Protection	Protective. Exposure prevented by covering waste in place, covering waste in a central consolidation area or removing waste to an off-site landfill. Impacts to surface water reduced by containing or removing waste.	Protective. Exposure prevented by removing waste to a repository and covering with a vegetated soil cover. Impacts to surface water reduced by removing waste piles and consolidating in an engineered and properly sited repository. Addition of a repository may permit additional cleanup of CERLCA mining-related materials beyond the scope contemplated in the selected OU3 and OU4 ROD remedies.
Compliance with ARARs	Complies with action-, chemical-, and location-specific ARARs.	Complies with action-, chemical-, and location-specific ARARs.
Long-Term Effectiveness and Permanence	Minimal-moderate residual risk. Relies on containment of individual waste rock piles beneath covers (moderate risk), removal to off-site landfill (no residual risk) and consolidation (minimal residual risk).	Minimal residual risk. Relies on disposal in engineered repository to prevent migration and exposure. (Retains option of individually capping many of the waste piles, however, facilitates removal of materials that may be difficult to cap in place due to steep slopes or limited space for on site capping)
Reduction in Toxicity, Mobility, or Volume	Mobility reduced through soil/rock cover. Mobility permanently eliminated through removal to Front Range landfill. Mobility significantly reduced through on-site consolidation. No reduction in toxicity or volume.	Mobility significantly reduced through consolidation in on-site repository. No reduction in toxicity. Drying of the treatment plant solids will significantly reduce its volume.
Short-Term Effectiveness	Minimal-moderate short-term risk. Capping waste piles in place does not require excavation or contaminated material handling. Consolidation or off-site transport requires excavation of contaminated material. Risks are manageable through dust control and material handling procedures.	Minimal-moderate short-term risk. Consolidation involves excavation of contaminated material. Risks are manageable through dust control and material handling procedures during loading and transport of mine waste and drying and handling of treatment solids.
Implementability	Implementable. Readily available and proven technology.	Implementable. Readily available and proven technology.
Cost	Moderate. The OU 4 remedy estimated capital cost is \$11,833,000 and the estimated annual operations and maintenance cost is \$926,000 (ROD, 2004). The OU4 ROD contemplated a local means of mine waste management such as consolidating mine waste or placement in a repository. This was anticipated to include some mine waste piles and sediment from detention structures. However, OU 4 remedy cost estimates did not include constructing or operating a repository. If materials unsuited for in-place capping were disposed of in a Front Range landfill, costs would be higher than original estimates. Current Argo Treatment Plant solids disposal and OU4 treatment solids disposal (from future treatment of Gregory Incline water) in a Front Range landfill are estimated to cost approximately \$245,000 per year.	Moderate. The construction of a 270,000 cubic yard on-site repository is estimated to cost \$1,470,000. Capital costs would be offset some by cleanup efficiencies since the proposed repository site otherwise needs remediation. Costs saved by using the repository to manage treatment solids are estimated to be \$165,000 per year. Sediment and mine waste disposal savings over offsite disposal are estimated to be another \$25,000 to \$65,000 per year, for a total operational benefit of \$190,000 to \$230,000 per year. Annual operations and maintenance costs for the repository are estimated to be \$175,000. Therefore, the repository is anticipated to provide an annual benefit of \$15,000 to \$55,000 per year.

Comments may be mailed, faxed or emailed to any of the following:

Jim Lewis, State Project Manager

(303) 692-3390

Email: jim.lewis@state.co.us

Or Marion Galant, Community Involvement Manager

(303) 692-3304

Email: marion.galant@state.co.us

Mailing Addresses:

Colorado Department of Public Health and Environment

4300 Cherry Creek Drive South, B2

Denver, CO 80246 Fax: (303) 759-5355 Mike Holmes, EPA Remedial Project Manager

(303) 312-6607

Email: holmes.michael@epa.gov

Or Peggy Linn, EPA Community Involvement

Coordinator (303) 312-6622

Email: linn.peggy@epa.gov

EPA

999 18th Street OCPI Suite. 300 Denver, CO 80202 Fax: (303) 312-6961

HMWMD-RP-B2 2900 Colorado Department of Public Health and Environment 4300 Cherry Creek Drive South Denver, CO 80246-1530

ADDRESS SERVICE REQUESTED